RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole # 41-03-12

Log Event A

Borehole Information

Farm : SX | **Tank :** SX-103 | **Site Number :** 299-W23-137
N-Coord : 35,596 | **W-Coord :** 75,869 | **TOC Elevation :** 661.46
Water Level, ft : | **Date Drilled :** 1/24/1972

Casing Record

Type : Steel-welded | **Thickness :** 0.280 | **ID, in. :** 6
Top Depth, ft. : 0 | **Bottom Depth, ft. :** 140

Equipment Information

Logging System : 2 | **Detector Type :** HPGe | **Detector Efficiency:** 35.0 %
Calibration Date : 03/1995 | **Calibration Reference :** GJPO-HAN-1

Logging Information

Log Run Number : 1 | **Log Run Date :** 5/5/1995 | **Logging Engineer:** Gary Lekvold
Start Depth, ft.: 0.0 | **Counting Time, sec.:** 100 | **L/R :** L | **Shield :** N
Finish Depth, ft. : 47.0 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a

Log Run Number : 2 | **Log Run Date :** 5/8/1995 | **Logging Engineer:** Gary Lekvold
Start Depth, ft.: 46.0 | **Counting Time, sec.:** 100 | **L/R :** L | **Shield :** N
Finish Depth, ft. : 95.5 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a

Log Run Number : 3 | **Log Run Date :** 5/9/1995 | **Logging Engineer:** Gary Lekvold
Start Depth, ft.: 138.0 | **Counting Time, sec.:** 100 | **L/R :** L | **Shield :** N
Finish Depth, ft. : 94.5 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : D.C. Stromswold

Data Processing Reference : Data Analysis Manual Ver. 1 Analysis Date : 7/19/1995

Analysis Notes :

Borehole 41-03-12 was logged in three log runs: run 1 from 0 to 47 ft, run 2 from 46 to 95.5 ft, and run 3 from 138 to 94.5 ft. The pre- and post-survey field verification spectra showed consistent peak activities, but energy calibrations differed due to gain drift in the instrumentation. Spectra were recalibrated for energy versus channel. Each run was recorded on 0.5-ft stations with a counting time of 100-s.

The total measured casing thickness is 0.25 in. The casing correction used was that for 0.25 in.

Naturally occurring K-40, U-238, and Th-232 concentration changes at 76 ft are probably due to changes in the lithology. The U-238 concentration above 46 ft appears to be erroneously high, as plotted from the 609-keV peak of U-238. Comparison with the 1764k keV peak from U-238 did not show the distinct increase in concentration above this depth, although the calculated concentrations from that gamma ray were very discontinuous. Note that the break between the two runs occurred near 46 ft. Verification spectra for runs 1 and 2 did not exhibit any anomalies to account for such a shift in the calculated U-238 concentration.

Cs-137 was the only man-made radionuclide detected. It occurred continuously from the surface to about 22 ft, with the highest concentration of about 70 pCi/g at 2 ft. It was also detected in low concentrations at discontinuous locations to TD.

Log Plot Notes:

Three log data plots are provided with a continuation sheet for each plot due to the greater depth of the borehole. The cesium concentration is provided in a separate plot to document the concentration and indicate the shape of the cesium distribution. The error of the cesium concentration determination is shown by error bars that represent the 95 percent confidence interval. The calculated MDA is shown on this plot as open circles. If the calculated concentration is less than the MDA, it is considered a non-detect and the concentration is not reported.

A plot of naturally occurring potassium, uranium, and thorium (K-40, U-238, and Th-232) is provided to permit correlation of these data with geologic information. The natural gamma logs are shown in a separate plot to allow correlation of these data with the lithology. These data are also plotted with the MDA values and the error bars. On the Th-232 plot, the MDA value is shown as zero at some depth locations. This zero value was a result of an anomaly in the commercial spectrum analysis software which has been corrected by the vendor. Because the MDA calculation at these few points is not significant relative to the intended use of the thorium plot, the data were not reprocessed and corrected. Therefore, these MDA data points on the plot should be ignored.

A combination plot of individual radionuclide concentrations is provided that includes the total gamma rate calculated from the spectral data and the WHC Tank Farms gross gamma ray log data obtained from gross gamma logging systems.